

Conclusion.– Gait parameters tend to be better EC versus EODG. The study should be continued in order to confirm or refute this tendency observed in a small group and assess the significance; The overall results will aim to establish a hierarchy of rehabilitation exercises for balance problems when the target is the visual dependence or proprioceptive recruitment.

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P006-e

IsiMove: A new platform of postural disturbance

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Keywords: Platform; Dynamic posturography; Commands; Balance assessment
Objectives.– The aim of this work was to develop a robotic dynamic posturography platform that allows on one hand the balance assessment and on the other hand, to establish new rehabilitation protocols. This system was designed from a specification conditions defined by clinicians.

Materials and methods.– The specifications developed by ISIR engineers and clinicians of Rothschild hospital led to propose the following features: a dual force platform (for a separate study of both lower limbs), motorized in four space directions (tilts or translations along the antero-posterior and medio-lateral axes and rotation around the vertical axis) and lateral supports with force sensors in order to measure manual supports for the most unstable patients.

Results.– The result is the platform “IsiMove” conducted by the company AssistMov.

At first, we evaluated its stabilometry function. To do this, we compared the measures with weights to those obtained with a reference stabilometry platform: SATEL. Errors measured on the two platforms are equivalent. They are 0.3 mm according to the antero-posterior axis and 0.2 mm along the medial-lateral axis. Then we compared the results obtained during a classical subject evaluation. Static variation indices on both platforms were similar and less than 30%. The platform “IsiMove” is a robotic system, that is to say, the movement of the plate may be inferred by setting parameters (frequency or amplitude of oscillations.), or by “react” to the subject’s movement. These two behaviours are implemented as two control laws: the active mode and the reactive mode.

Discussion.– This platform is composed with four measuring systems effort (hands and feet) and a movable plate in all space directions on a controlled manner. Preliminary results confirm that the results measured in static are comparable to a reference stabilometry platform. We are currently developing an experimental protocol for evaluating dynamic balance applicable to different pathologies.

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P007-e

Effect of robotic gait training on biomechanical parameters of gait in the chronic hemiplegic adults

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Keywords: Chronic hemiplegic; Robotic rehabilitation; Locomotion

Objective.– Hemiplegia is a more or less complete loss of a hemicorps voluntary motor following a brain injury, usually resulting in alterations of the locomotor system with persistent disorders of movement and posture. Several studies [1–3] have shown different profiles of walking patterns in hemiplegic patients. We were interested in studying the gait pattern called “stiff knee gait” with the main objective to highlight the role of a robotic rehabilitation in improving or modifying/changing the walking pattern in adults with chronic hemiplegic disorders [4].

Materials/Participants and methods.– Data were collected by a motion analysis system (Vicon[®]–Oxford Metrics, Oxford, UK) in order to achieve a Clinical Gait Analysis before and after a robotic rehabilitation (Lokomat[®]). Four intensive sessions per weeks during five weeks were performed by nine chronic hemiplegic adults.

Results.– The results show improvement:

- in locomotor parameters (walking speed, step length and step frequency associated with decreased of support phase on the healthy side);
- in static and dynamic balance;
- in knee flexion on the affected side during swing phase.

Discussion.– The robotic assistance allows the subject to acquire a significantly higher number of sensorimotor informations relative to a normal rehabilitation. This first study provides experimental evidence of the importance and usefulness of the robotic rehabilitation as an aid in the rehabilitation of gait patterns in adults chronic hemiplegic.

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